# California State Water Resources Control Board Leaking Underground Fuel Tank (LUFT) Guidance Manual

# A Behind the Scenes Look at Development of the LUFT Manual

2010 SAM Fall Forum

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# Why a New LUFT Manual

- Old LUFT Manual is significantly outdated.
- Many regulators have asked for better guidance.
- There is a need for better tools to train new regulators and educate RPs/consultants.
- Better guidance may improve work quality and consistency.
- Better guidance may help to reduce cost to the State Cleanup Fund.

### **LUFT Manual Collaboration**

<u>Fall 2008</u> – Public meetings held throughout the State to gather input from stakeholders.

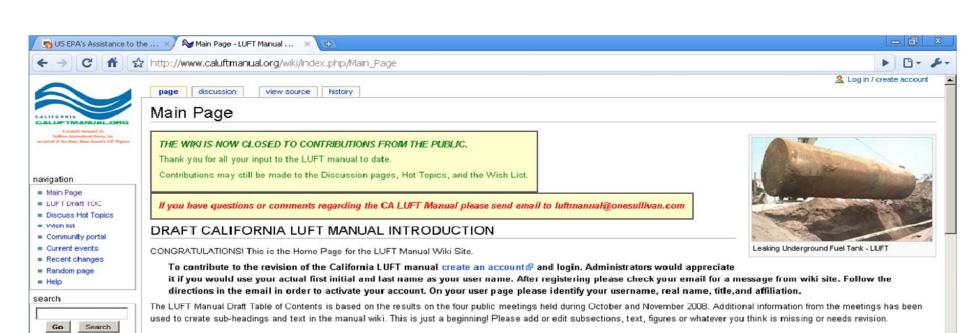
Workshops resulted in 108 specific topics that stakeholders believed the revised manual should address.



### **CA LUFT Manual Wiki Site**

<u>Winter 2008</u> - Planning committee used stakeholder input to create a framework for the new manual and launched the CA LUFT Manual Wiki Site

- A collection of web pages that allowed users to freely create and edit Web page content using any Web browser
- A new and collaborative way to provide program guidance
- An opportunity for all sectors of the UST community (regulators, consultants, responsible parties, industry, inspectors) to provide the initial content of the manual



#### MISSION STATEMENT

to olbox

= What links here

= Related changes

Printable version
 Permanent link

= Upload file

Special pages

The Planning Team has developed the following Mission Statement as a guide for the LUFT Manual revision.

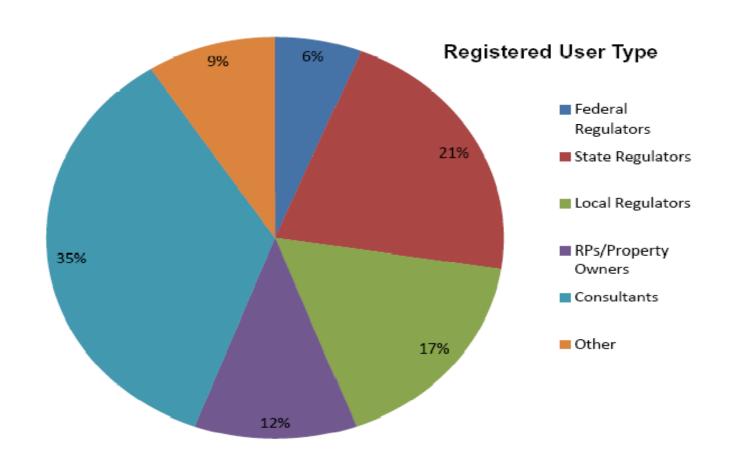
"The mission of the revised CA LUFT Manual is to provide guidance to all stakeholders in order to make good decisions regarding the investigation and cleanup of unauthorized releases of fuels from underground storage tanks in the State of California. The manual content is designed to be user-friendly, "state of the science", non-prescriptive, unbiased, and to guide its users towards common-sense solutions for fuel-impacted sites."



BACKGROUND ON WIKIS

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## Wiki Site Contributors by Stakeholder Group



# **CA LUFT Manual Working Group Wiki Site**

<u>July 2009</u> – A Working Group Wiki to facilitate further refinement of the Manual.

- Stakeholders within the UST community volunteered to champion the various chapters of the CA LUFT Manual.
- Champions built Working Groups consisting of regulators, RPs, and consultants to distill the information contributed by the public to the CA LUFT Manual Wiki Site into a user-friendly and meaningful manual.
- Working Groups consisted of approximately 20-30 stakeholders
- Conference calls and web based meetings were held frequently to discuss the various chapters.

### **CA LUFT Manual Table of Contents**

- **Chapter 1: Introduction and Process Overview**
- Chapter 2: The Fate and Transport of Petroleum in the Subsurface
- **Chapter 3: Conceptual Site Models**
- **Chapter 4: Health and Safety**
- **Chapter 5: Workplans**
- **Chapter 6: Site Assessment**
- **Chapter 7: Vapor Intrusion**
- **Chapter 8: Analytical Requirements**
- Chapter 9: Risk Assessment and Management
- **Chapter 10: Corrective Action and Remediation**
- **Chapter 11: Reports**
- **Chapter 12: Case Closure**
- **Chapter 13: UST Cleanup Fund**
- **Chapter 14: Green Technology and Processes**
- **Chapter 15: Geotracker Requirements**
- **Chapter 16: References and Resources**
- Chapter 17: Appendices, Glossary, Definitions

### **CA LUFT Manual Table of Contents**

#### **Section 1: Administrative**

Roles and Responsibilities
UST Cleanup Fund
GeoTracker
Health and Safety
Workplans
Corrective Action Plans
Reports
Green and Environmentally Responsible Cleanups

### **CA LUFT Manual Table of Contents (cont)**

### Section 2: Initial Response, Reporting, and Tank Removal

Initial Reporting and Abatement Release Response Prioritization Tank Removal and Closure in Place

- San Diego County
- Santa Fe Springs Department of Fire-Rescue
- County of Orange

### **CA LUFT Manual Table of Contents (cont)**

### **Section 3: Investigation and Remediation**

Fate and Transport of Petroleum in the Subsurface Conceptual Site Model Site Assessment Laboratory Analysis and Methods Risk Evaluation and Management Remediation

### **Appendices Associated with Section 3**

LUFT Screening Tools Detail and Calculations Soil Boring Description Vapor Intrusion

# Fate and Transport of Petroleum in the Subsurface

- Presents state-of-the-science understanding of how petroleum migrates and weathers in the subsurface and why
- Discusses the typical products and additives
- Covers each phase that could be encountered in the subsurface
  - Migration of LNAPL
  - Dissolution of Petrol Hydrocarbons into Water
  - Migration of Dissolved Phase Constituents
  - Vapor Migration
  - Biodegradation

# **Conceptual Site Model**

- CSM is a thought process, not just a graphical depiction.
- CSM conveys an understanding of the site conditions
- Developed early and iteratively
- CSM provides a framework for entire process and serves as a communication tool
- Identify sources, exposure pathways (point of exposure and exposure route), and receptors that are likely to be impacted

# **Conceptual Site Model**

### **Four Basic Exposure Scenarios**

- Dermal contact with soil,
- Volatilization from impacted soil or groundwater into indoor air,
- Leaching from soil to groundwater,
- Groundwater that is already impacted above water quality objectives (WQOs).

### Site Assessment

- Initial Approach to SA
- Pre-Field Work Considerations
- Soil Investigation
  - Drilling Methods
  - Soil Sampling and Description
- Groundwater Investigation
  - Grab GW Samples
  - Well Construction and Development
  - Monitoring Well Sampling
- Soil Vapor Investigation

# **Laboratory Analysis and Methods**

### Recommended Analytes and Methods for Soil and Groundwater

| Source Fuel/Product Type  | Analytes   | Analytical Method          | Comments                                      |
|---|--|----------------------------|---|
| Gasoline  | BTEX, naphthalene,<br>MTBE, TBA<br>(plus EDC, EDB for pre-1992<br>release) | EPA 8260B                  |   |
| Jet A/JP5/JP8, Diesel #1 or #2                                    | BTEX, naphthalene  | EPA 8260B                  |   |
| Heavier Fuel Oils (Fuel oil #4, marine diesel, bunker fuel, etc.) | BTEX,<br>naphthalene,<br>16 priority pollutant PAHs                        | EPA 8260B,<br>EPA 8270 SIM | PAHs only for fuels heavier than<br>Diesel #2 |
| Waste (Used) Motor Oil  | BTEX,<br>naphthalene,<br>chlorinated VOCs<br>MTBE, TBA                     | EPA 8260B                  |   |
|   | 16 priority PAHs   | EPA 8270 SIM               |   |
|   | Wear Metals: Cadmium,<br>Chromium, Nickel, Lead, Zinc                      | EPA 6020/200.8             | Soil only                                     |

### **Laboratory Analysis and Methods (cont)**

### "TPH" Approach

- Analysis of Bulk TPH for Risk Assessment
- Fractionated (Aliphatics/Aromatics) Analysis for Risk Assessment
  - VPH = C5 to C8 ali, C9 to C12 ali, C9 to C10 aro
  - EPH = C9 to C18 ali, C19 to C32 ali, C9 to C16 aro, C17 to C32 aro
  - MADEP Analytical Methods (Modified)
  - More Expensive than 8015, Only a Few Representative Samples Anticipated
- Silica Gel Cleanup for DRO/ORO
- Method 8015 TPH: Develop Site-Specific TPH/VPH/EPH Correlation

## **Laboratory Analysis and Methods (cont)**

- Analytes for Soil Vapor using Modified EPA Methods 8260B, TO-15/17
  - O MTBE
  - o BTEX
  - Naphthalene
  - o EDC
  - o EDB
- Plus Leak Detector Compound; O2 and CO2 (ASTM D-1946)
- Fractionated Analysis: APH [C5 to C8 ali, C9 to C12 ali, C9 to C10 aro]
- Method 8015 TPH is NOT recommended

## **Risk Evaluation and Management**

- Initial Risk Screening to Established Levels
- LUFT-Specific Risk Screening Tools
  - Direct Contact with Soil
  - Vapor Intrusion
  - Leaching from Soil to Groundwater (tabled)
  - Groundwater Already Impacted Above WQOs
- LUFT Risk Management Response Options

### Remediation

- Pros and Cons of Several Remedial Actions
- Remediation of LNAPL
- Soil Excavation, SVE, Bioventing
- Air Sparging, Biosparging, Ozone Sparging, Bioremediation, Groundwater Extraction
- Natural Attenuation
- Remedial Effectiveness

# **Appendix: Vapor Intrusion**

- Defines VI
- Background/History of Guidance Docs and Models
- VI Evaluation
  - Develop CSM
  - Evaluation of Complete Pathway
  - Mitigation
- Key Points
  - Biodegradation in Vadose Zone Often Serves as a Barrier to petroleum VI
  - VI Pathway Screening Table

# **Your Input**

- The LUFT Manual is available at the SWRCB website for public comment until October 4, 2010
  - Send your questions and comments to the LUFT Manual email address at luftmanual@onesullivan.com
- Contact Adrienne Barnes at <u>abarnes@onesullivan.com</u> or 720-413-9703